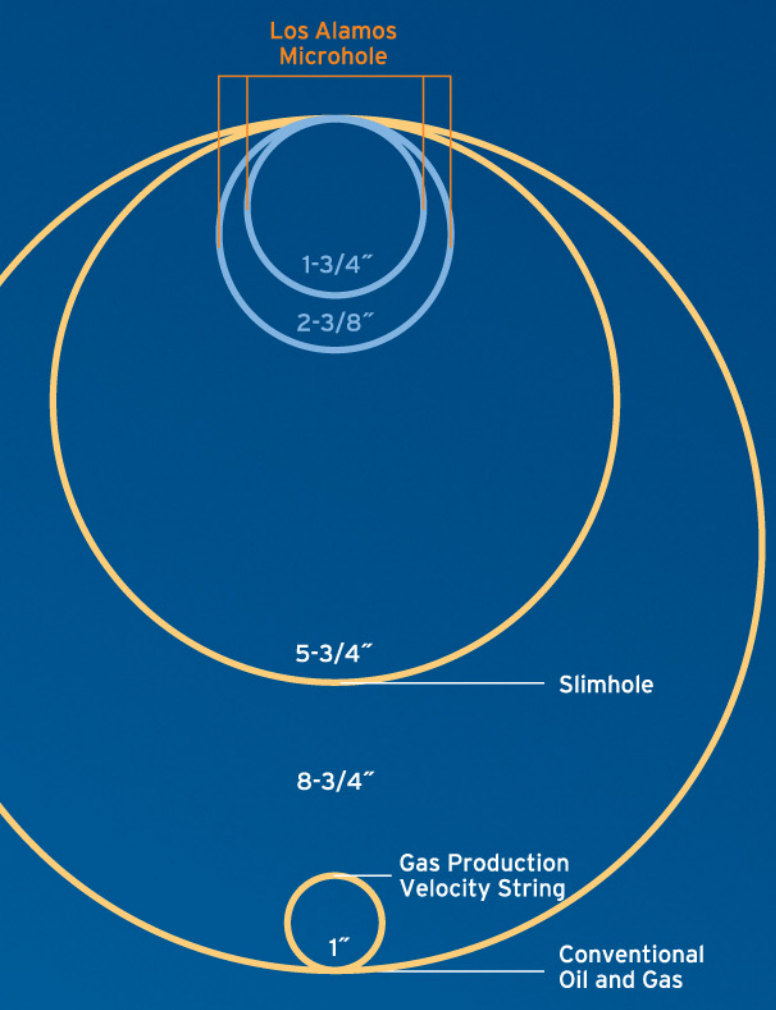
MICROHOLE DRILLING HITS THE BULL'S EYE

A Penny-Wise, Environmentally Smart Drilling Solution



Hitting the Bull's Eye
Conventional oil and gas wells are typically 8-3/4 inches in diameter. Microholes are one-quarter to one-eighth of the size of conventional wells. This smaller size lowers the monetary and environmental costs of drilling.

The next big thing in petroleum drilling is to think small. Los Alamos scientists have successfully pioneered microhole drilling technology, a targeted way to produce gas and oil from reservoirs depleted by use of conventional technology and get more high-quality seismic information than would otherwise be possible.

Microholes reduce the cost of drilling

Whereas conventional drilling technology creates boreholes measuring 5-3/4 to 8-3/4 inches, microhole drilling shrinks borehole diameters to 2-3/8 inches. Microholes have smaller environmental footprints and cost less. Compared with full-size wells, microholes cut cost by 70 to 80 percent because they require less material, fewer people, and smaller equipment.

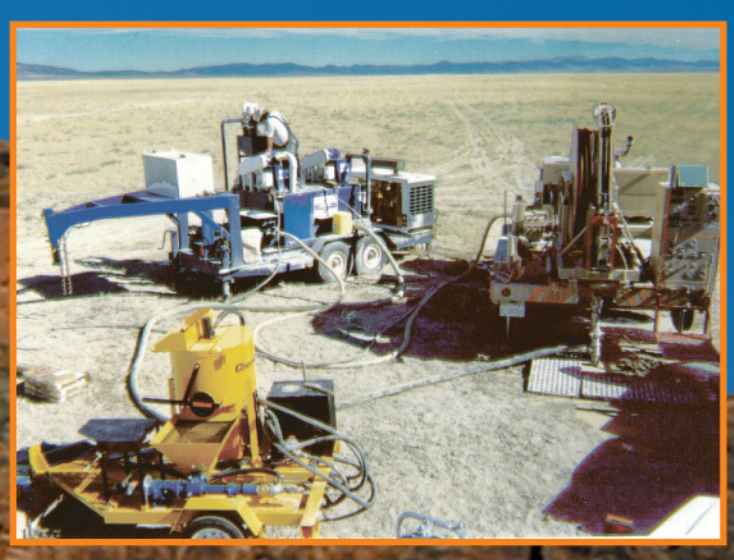
Microholes reach to new depths

By adapting existing coiled-tubing deployed drilling technologies, Los Alamos scientists have successfully demonstrated that microholes can be drilled to a depth of 800 feet. Their goal is to successfully drill to 5,000 feet, a depth required to reach about 60 percent of the nation's remaining oil reserves. The team has also completed design and construction of the world's first microhole for stripper oil production at the Department of Energy's Rocky Mountain Oilfield Test Center near Casper, Wyoming. The hole is 497 feet deep and 2-5/8 inches in diameter.

Miniature sensors measure up

The Los Alamos team has obtained seismic data from tests at its San Ysidro, New Mexico, microhole site by using prototypes provided by industrial partners. Results show that cutting-edge miniature sensors are as sensitive as their full-size counterparts deployed in conventional wells. High sensitivity, along with reduced noise in subsurface environments, translates into high-quality seismic information. Suitably located microholes dedicated to seismic measurements yield more information than do existing wells, which allow only limited use because oil production must be stopped during seismic measurements.

Thinking Small with Miniature Sensors
Marks Products, Inc., provided a miniaturized prototype for a geophone, and Input/Output, Inc., provided a miniaturized prototype for an accelerometer. These microhole sensors measure ground motion on the passage of a seismic wave. Their output is comparable to that of conventional sensors.



Reducing the Environmental Footprint
The microhole drilling system has a smaller environmental footprint. The system consists of a mechanical rotary drag bit, a hydraulically powered positive displacement motor at the end of a coiled-tubing drill stem. Shown are the coiled-tubing drilling rig (tan), drilling-fluid conditioning system (blue), and casing grouting equipment (yellow). The system has been tested at a site in north central Nevada (shown) as well as the San Ysidro, New Mexico, test site.

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